Amendment to the Claims

Claims 1-9 (cancelled).

10. (New) A power control system for an electric motor having at least one magnetic bearing, said system comprising:

a main power supply;

a DC link bus connected to said main power supply, said bus supplying power for the electric motor and for a bearing actuator;

a motor controller;

a bearing controller;

a supervisory controller;

a DC/DC converter supplied from said DC link bus, said DC/DC converter providing low voltage DC power supply for said motor controller, said bearing controller and said supervisory controller;

said supervisory controller receiving signals from an AC power monitor and a capacitor connected across said DC link bus, said supervisory controller then signaling said motor controller, said motor controller controlling IGBT switches connecting motor winding to the DC link bus in accordance with a position of a rotor of the motor; each switch having a parallel diode of a polarity opposing a motor current flow during normal operation of said main power supply;

wherein, in one of: signals of failure from the AC power monitor and of: a drop in a voltage across said capacitor, all switches are turned off and an existing current in the motor winding flows through corresponding diodes to the DC link bus, thereby providing an immediate boost to a voltage of the DC link bus; when the DC link bus voltage drops, two switches are closed to short circuit the motor winding and immediately initiate flow of a current therethrough; and as soon as the current flow reaches a predetermined magnitude, the switches are turned off, whereby a winding voltage rises to above the bus voltage and a generated current is pumped back to the capacitor.

11. (New) The power control system as defined in claim 10, said switches being selectively switched to cause the current generated in the motor winding to flow in one direction into said DC link bus only while the winding voltage is greater than the voltage of the DC link bus.

12. (New) The power control system as defined in any claim 10, said switches comprising a first and a second switches connected between a first end of the motor winding and positive and negative sides of said DC link bus respectively; a third and a fourth switches connected between a second end of the motor winding and the positive and negative sides of said DC link bus respectively; a parallel diode being connected across each switch to oppose a normal motor current flow.

13. (New) The power control system as defined in claim 12, wherein either said first and third or said second and fourth switches are turned on to generate the current in the motor winding, and immediately when a desired current is generated said switches are turned off, whereby the winding voltage rises above the DC link bus voltage and the current flows into the DC link bus.

14. (New) The power control system as defined in claim 13, said switches being opened when the power failure is detected so that the existing motor current flows through corresponding diodes and into the DC link bus to boost the DC link bus voltage, and when said DC link bus voltage drops, either said first and third, or said second and fourth switches are closed to short circuit the motor winding and immediately initiate current flow therethrough, whereupon said switches are opened causing the winding voltage to rise above the DC link bus voltage, the generated current being fed back to the DC link bus.

15. (New) The power control system as defined in claim 14, the voltage across the dc link bus being determined by a capacitor connected between the positive and negative sides of the DC link bus, said connector storing power fed back from the winding for motor run down.

16. (New) A method of running down a high speed DC electric motor run on magnetic bearings in an event of a failure of a main power supply thereof, including the steps of:

supplying the motor and the magnetic bearings from a high voltage DC bus connected to the main power supply;

providing a DC/DC converter to supply low voltage DC power to a magnetic bearing controller and to a motor controller, using switching devices to control a motor operation;

sensing a failure of the main power supply and providing a signal to the motor controller; and

selectively controlling the switching devices;

said step of selectively controlling the switching devices comprising initially feeding an existing motor current to the DC bus, detecting when a voltage of the DC bus drops below a predetermined value, shorting windings of the motor, and as soon as a current flow in the motor winding reaches a predetermined magnitude, canceling said shorting of the windings of the motor, whereby the windings voltage rises to above the voltage of the DC bus; feeding a resulting generated current back to the DC bus;

said step of selectively controlling the switching devices being repeating until the motor is run down.

17. (New) The method according to claim 16, further comprising the steps of connecting a capacitor across the DC bus and of prôviding an AC power monitor for the main power supply, said step of sensing a failure of the main power supply comprising one of: sensing a voltage drop across the capacitor and of: the AC power monitor emitting a power failure signal.

18. (New) The method according to claim 16, said step of detecting when the bus voltage drops below a predetermined value comprising measuring an indicator voltage by means of a voltage sensor.

19. (New) The method according to claim 17, the switching devices comprising IGBT switches connected between each end of the motor winding and positive and negative side of the DC bus respectively, a diode being connected in parallel with each switch, the diodes enabling the motor to act as a generator and feed current into the DC bus to assist the capacitor in maintaining the bus voltage until the motor is run down.

Consideration of this Preliminary Amendment is respectfully requested.

Respectfully submitted,
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